

**REMARKS**

Upon entry of the foregoing amendments, claims 1-36 are pending in the present application. Claims 1-17 and 23-33 have been amended and new claims 34-36 have been added to the application. No new matter is being presented. In view of the following remarks, allowance of claims 1-36 is respectfully requested.

**1. Drawings**

In the Office Action of June 27, 2007, the Examiner objected to the drawings and required that Figure 1 be labeled as prior art. However, Applicant respectfully notes that Figure 1, as originally filed, is labeled “PRIOR ART.” Accordingly, Applicant respectfully requests that the Examiner withdraw this objection.

**2. Specification**

The Examiner also objected to the specification for failing to provide proper antecedent basis for the claimed subject matter “a power sensing circuit” and “a power level feedback signal.” The specification (pages 25-26—see above) has been amended to incorporate the terminology of originally filed claims 25, 26, 30, and 31. Because the amendments to the specification are supported by the language of originally filed claims 25, 26, 29, and 30, it is submitted that these amendments do not present new matter. Moreover, claims 25, 26, 29, and 30 have been amended to clarify the subject matter being claimed. Accordingly, Applicant respectfully requests the Examiner withdraw the rejection.

**3. Claim Objections**

In the Office Action the Examiner objected to claims 9, 25, and 26 as containing minor informalities. Applicant has amended these claims to correct these informalities. Accordingly, it is respectfully requested that the Examiner withdraw the objections to these claims.

**4. Rejections Based On 35 U.S.C. 112**

The Examiner rejected claims 24 and 29 for a lack of antecedent basis. Applicant has amended claims 24 and 29 to provide for antecedent basis. Therefore, it is

respectfully requested that the Examiner withdraw the rejections.

**5. Rejections Based On 35 U.S.C. 35 U.S.C. 103**

a. *Shamlou in view of Muhammad in view of Hansen*

Claims 1, 2, 5, 7, 8, 10-22, 27, and 32 have been rejected under 35 USC 103(a) as being unpatentable over Shamlou et al., U.S. Patent No. 6,690,949 (hereinafter “Shamlou”) in view of Muhammad et al., U.S. Patent Publication No. 2003/0080888 (hereinafter “Muhammad”) and Hansen et al., U.S. Patent Publication No. 2002/0097791 (hereinafter “Hansen”). Applicant respectfully requests reconsideration of this rejection for at least the following reasons.

Applicant has amended independent claim 1 to recite a “transmitter ... comprising...a data encoder...encodes said series of low bit weight words...wherein the desired RF signal containing the encoded low bit weight words is transmitted to the receiver via a wireless channel.”

The Examiner’s rejection states that Shamlou discloses all the claimed subject matter except for (1) the use of an ADC with low bit weight words using oversampling and (2) a data encoder that provides error control coding.

The Examiner cites Muhammad as allegedly teaching a sigma-delta ADC and oversampling. *See* Office Action of June 27, 2007 page 4. However, Applicant notes that Muhammad’s sigma-delta ADC mixer is only used in a receiver, not a transmitter. Indeed, the “Field of Invention” of Muhammad states that the invention relates to “implementing an oversampling sigma-delta ADC structure within a receiver that incorporates a direct sampling mixer” (emphasis). Likewise, paragraph [0023] states that the detailed description focuses on a radio receiver mixer. Nowhere, however, does Muhammad teach or suggest that the disclosed sigma-delta ADC can be used at the transmitting end of a wireless system. To the extent that Muhammad generally teaches the advantages of using sigma-delta modulation over pulse code modulation for analog to digital conversion, Muhammad does not teach or suggest a “transmitter ... comprising...a data encoder...encodes said series of low bit weight words...wherein the desired RF

signal containing the encoded low bit weight words is transmitted to the receiver via a wireless channel,” because Muhammad’s disclosure only pertains to analog to digital conversion in wireless receivers.

In any event, it is well known in the art that wireless cellular communication systems, such as the system shown and described in Shamlou, use pulse code modulated signals with high bit weight words for transmitting voice data wirelessly. Thus, Shamlou teaches away from using sigma-delta modulation with a low bit weight word. Moreover, even if Shamlou did not teach away from using sigma-delta modulation with low bit weight words, Muhammad, at best, only teaches a sigma-delta mixer in the receiver of the communication system, not the transmitter. Therefore, even if these two references could be properly combined, they do not teach or suggest a “transmitter ... comprising...a data encoder...encodes said series of low bit weight words...wherein the desired RF signal containing the encoded low bit weight words is transmitted to the receiver via a wireless channel.”

The Examiner then cites Hansen as allegedly teaching a forward error correction unit. However, even if it is assumed that Hansen teaches this feature, Hansen fails to teach or suggest the features lacking from Shamlou and Muhammad, namely, “transmitter ... comprising...a data encoder...encodes said series of low bit weight words...wherein the desired RF signal containing the encoded low bit weight words is transmitted to the receiver via a wireless channel,” as presently recited in independent claim 1 of Applicant’s invention. Therefore, Shamlou, Muhammad, and Hansen, either alone or in combination with one another, fail to teach or suggest this feature. Accordingly, Applicant respectfully submits that independent claim 1 is patentable over Shamlou, Muhammad, and Hansen, either alone or in combination with one another.

Independent claim 17 has been amended to recite “transmitting said encoded low-bit weight digital transmission signal to a receiver via a wireless channel.” For this feature, the Examiner cites element 22 of FIG. 1 in Shamlou. Element 22 in Shamlou, which is cited by the Examiner, denotes an antenna of a receiving unit 14 that communicates with a transceiver station 30. However, nowhere does Shamlou teach or

suggest that the antenna 22 of the transmitting unit 12 “transmit[s] said encoded low-bit weight digital transmission signal to a receiver via a wireless channel,” as presently recited. That is, Shamlou’s antenna 22 of the receiving unit 14 presumably transmits high bit weight words (PCM), because the system in Shamlou is a conventional wireless cellular communication system.

Furthermore, for the reasons set forth above, neither Muhammad nor Hansen teach or suggest this feature either. Accordingly, Applicant respectfully submits that Shamlou, Muhammad, and Hansen, either alone or in combination with one another, fail to teach or suggest “transmitting said encoded low-bit weight digital transmission signal to a receiver via a wireless channel,” as presently recited in independent claim 17. Therefore, this claim is patentable over Shamlou, Muhammad, and Hansen, either alone or in combination with one another.

Independent claim 27 has been amended to recite a “transmitter ... comprising...a data encoder...encodes said series of low bit weight words...wherein the desired RF signal containing the encoded low bit weight words is transmitted to the receiver via a wireless channel” and “a receiver in communication with said transmitter via at least one wireless channel and receiving said desired RF signal, said receiver including a demodulator ... to generate a low bit weight digital signal by demodulating said RF signal.”

As set forth above in the discussion of independent claim 1, Shamlou, Muhammad, and Hansen, either alone or in combination with one another, fail to teach or suggest a “transmitter ... comprising...a data encoder...encodes said series of low bit weight words...wherein the desired RF signal containing the encoded low bit weight words is transmitted to the receiver via a wireless channel.” Because independent claim 27 also recites these features, this claim is patentable over Shamlou, Muhammad, and Hansen, either alone or in combination with one another, for at least the same reasons.

Furthermore, Shamlou, Muhammad, and Hansen, either alone or in combination with one another, also fail to teach or suggest “a receiver in communication with said transmitter via at least one wireless channel and receiving said desired RF signal, said

receiver including a demodulator ... to generate a low bit weight digital signal by demodulating said RF signal,” as presently recited in independent claim 27. For this feature, the Examiner cites element 14 shown in Figure 1 of Shamlou. While Figure 1 of Shamlou does show a receiving unit 14 which includes a demodulator 28, this demodulator 28 does not “generate a low bit weight digital signal by demodulating said RF signal,” as presently recited in claim 27. Because Shamlou describes a conventional wireless communication system, Shamlou’s demodulator 28 presumably retrieves high bit weight words (PCM) from the IF carrier signal 34. That is, Shamlou does not in any way teach or suggest “a receiver in communication with said transmitter via at least one wireless channel, said receiver including ...a demodulator...configured to generate a low bit weight digital signal by demodulating said RF signal,” as presently recited in claim 27. Thus, for this additional reason, it is submitted that independent claim 27 is patentable over Shamlou, Muhammad, and Hansen, either alone or in combination.

Regarding claims 2, 5, 7, 8, 10-16, 18-22, and 32, it is respectfully submitted that for at least the reason that claims 2, 5, 7, 8, 10-16, 18-22, and 32 depend from one of allowable independent claims 1, 17, and 27, respectively, and therefore contain each of the features as recited in these claims, claims 2, 5, 7, 8, 10-16, 18-22, and 32 are therefore also patentable over Shamlou, Muhammad, and Hansen, either alone or in combination with one another.

b. Shamlou, Muhammad, and Hansen in view of Peters

Claim 6 has been rejected under 35 USC 103(a) as being unpatentable over Shamlou, Muhammad, Hansen, and Peters et al, U.S. Patent No. 6,876,697 (hereinafter “Peters”). Applicant respectfully requests reconsideration of this rejection for at least the following reasons.

The Examiner cites Peters as allegedly teaching an I/Q modulator. However, even if it is assumed that Peters teaches this feature, Peters fails to teach or suggest the features lacking from Shamlou, Muhammad, and Hansen, namely, a “transmitter ... comprising...a data encoder...encodes said series of low bit weight words...wherein the desired RF signal containing the encoded low bit weight words is transmitted to the receiver via a wireless channel,” as presently recited in independent claim 1 of

Applicant's invention. Therefore, Shamlou, Muhammad, Hansen, and Peters either alone or in combination with one another, fail to teach or suggest the features of claim 1.

Accordingly, Applicant respectfully submits that dependent claim 6 is also patentable over Shamlou, Muhammad, Hansen, and Peters, either alone or in combination with one another.

c. Shamlou, Muhammad, and Hansen in view of A. Jacobsen

Claim 9 has been rejected under 35 USC 103(a) as being unpatentable over Shamlou, Muhammad, Hansen, and A. Jacobsen, U.S. Patent Publication No. 2003/0193889 (hereinafter "Jacobsen"). Applicant respectfully requests reconsideration of this rejection for at least the following reasons.

The Examiner cites Jacobsen as allegedly teaching forward error control input to a parallel to serial converter. However, even if it is assumed that Jacobsen teaches this feature, Jacobsen fails to teach or suggest the features lacking from Shamlou, Muhammad, and Hansen, namely, a "transmitter ... comprising...a data encoder...encodes said series of low bit weight words...wherein the desired RF signal containing the encoded low bit weight words is transmitted to the receiver via a wireless channel," as presently recited in independent claim 1 of Applicant's invention. Therefore, Shamlou, Muhammad, Hansen, and Jacobsen either alone or in combination with one another, fail to teach or suggest the features presently recited in independent claim 1. Accordingly, Applicant respectfully submits that dependent claim 9 is also patentable over Shamlou, Muhammad, Hansen, and Jacobsen.

d. Shamlou, Muhammad, and Hansen in view of Watanabe

Claims 3, 4, and 33 have been rejected under 35 USC 103(a) as being unpatentable over Shamlou, Muhammad, Hansen, and Watanabe, U.S. Patent No. 7,136,420 (hereinafter "Watanabe"). Applicant respectfully requests reconsideration of this rejection for at least the following reasons.

The Examiner cites Watanabe as allegedly teaching a delta sigma modulator operating at a sampling frequency of 2.8224 MHz. However, even if it is assumed that Watanabe teaches this feature, Watanabe also fails to teach or suggest the features lacking from Shamlou, Muhammad, and Hansen, specifically, a "transmitter ...

comprising...a data encoder...encodes said series of low bit weight words...wherein the desired RF signal containing the encoded low bit weight words is transmitted to the receiver via a wireless channel,” as presently recited in independent claims 1 and 33 of Applicant’s invention. Therefore, Shamlou, Muhammad, Hansen, and Watanabe either alone or in combination with one another, fail to teach or suggest the features presently recited in independent claims 1 and 33. Accordingly, Applicant respectfully submits that dependent claims 3 and 4 and independent claim 33 are also patentable over Shamlou, Muhammad, Hansen, and Watanabe.

e. *Shamlou and Muhammad in view of Jackson*

Claims 23 and 24 have been rejected under 35 USC 103(a) as being unpatentable over Shamlou, Muhammad, and Jackson et al., U.S. Patent No. 5,592,165 (hereinafter “Jackson”). Applicant respectfully requests reconsideration of this rejection for at least the following reasons.

Applicant has amended independent claim 23 to recite “a demodulator responsive to the digitally modulated RF signal and configured to generate a low bit weight digital signal by demodulating the digitally modulated RF signal.” Applicant submits that this feature is not taught or suggested by the references cited by the Examiner.

In the Office Action on page 14, the Examiner alleges that:

“it is obvious ...to combine the teaching of sigma-delta ADC of Muhammad with the wireless communication system of Shamlou et al. So, that the demodulator is responsive to a digitally modulated RF signal and configured to generate a digital low bit weight digital signal. By doing so, provide noise shaping and high frequency operation in a radio communication system.”

However, Applicant notes that even if the ADC of Muhammad is combined with the receiving unit of Shamlou in the manner suggested by the Examiner, this combination would not teach the Applicant’s “demodulator responsive to the digitally modulated RF signal and configured to generate a low bit weight digital signal by demodulating the digitally modulated RF signal.”

Although it is unclear exactly how the Examiner proposes to combine the ADC of Muhammad with the device shown in Figure 1 of Shamlou, it appears that the Examiner is suggesting that the ADC be incorporated into Shamlou’s demodulator 28 shown in

Figure 1 to either (1) process the IF signal 34 directly prior to demodulation or (2) process the baseband signal once the carrier has been demodulated by the demodulator 28.

Assuming Applicant's understanding is correct, the sigma-delta analog to digital converter (ADC) of Muhammad would not operate to demodulate the RF signal received by the receiving unit 14 shown in Figure 1 of Shamlou. The demodulator 28 shown in Shamlou is configured specifically to apply the reverse operation as the modulator 16 to retrieve the baseband signal from an intermediate frequency (IF) carrier signal. Thus, the application of the analog to digital converter (ADC) of Muhammad to the signal 34 provided by the receiver 24 to the demodulator 28 would be inappropriate, because this would change the characteristics of the IF signal 34 to the point where the baseband information signal could not be retrieved by proper demodulation. Therefore, the Examiner's suggestion that Muhammad's ADC should be incorporated with the demodulator 28 of Shamlou in this manner would render Shamlou's demodulator 28 and receiving unit 14 inoperable and unfit for their intended purpose.

To the extent that the Examiner's suggestion is to incorporate Shamlou's ADC after the IF signal 34 is demodulated to retrieve the baseband signal, it is respectfully noted that this hypothetical modification would not meet the language of Applicant's claim 23, namely, "a demodulator responsive to the digitally modulated RF signal and configured to generate a low bit weight digital signal by demodulating the digitally modulated RF signal." That is, because the IF signal 34 would have already been demodulated in demodulator 18 prior to the analog to digital conversion of the demodulated signal by the ADC of Muhammad, this combination would not "generate a low bit weight digital signal by demodulating the digitally modulated RF signal." If anything, this hypothetical combination would generate a low bit weight digital signal by sampling the already demodulated signal, not "generat[ing] a low bit weight digital signal by demodulating the digitally modulated RF signal," as presently recited in claim 23.

Therefore, Applicant respectfully submits that regardless of how the Examiner is combining Muhammad's sigma delta analog to digital converter (ADC) with Shamlou's demodulator 28, the combination either renders Shamlou inoperable or does not teach the

features of Applicant's claim. The Examiner appears to be relying on the general advantages of delta sigma modulation, as taught by Muhammad in the abstract, without regard to the differing structures, functions, and operations of the two systems shown in Shamlou and Muhammad. In other words, the application of Muhammad's ADC to Shamlou's demodulator 28, in the manner suggested by the Examiner, would be entirely inappropriate. Accordingly, Applicant respectfully submits that contrary to the Examiner's assertion Shamlou and Muhammad, either alone or in combination with one another, fail to teach or suggest "a demodulator responsive to the digitally modulated RF signal and configured to generate a low bit weight digital signal by demodulating the digitally modulated RF signal," as presently recited in claim 23.

The Examiner acknowledges that Shamlou and Muhammad fail to teach a digital decimating low pass filter. *See* page 14 of the Office Action of June 27, 2007. The Examiner relies on Jackson as allegedly teaching this feature. However, even if it is assumed that Jackson does generally teach a decimating filter, Jackson fails to teach or suggest the features lacking from Shamlou and Muhammad, specifically, "a demodulator responsive to the digitally modulated RF signal and configured to generate a low bit weight digital signal by demodulating the digitally modulated RF signal," as presently recited in independent claim 23 of Applicant's invention. Therefore, Shamlou, Muhammad, and Jackson, either alone or in combination with one another, fail to teach or suggest the features presently recited in independent claim 23, and this claim is patentable over the references cited.

Regarding claim 24, it is respectfully submitted that for at least the reason that claim 24 depends from allowable independent claim 23, and therefore contains each of the features as recited in this claim, claim 24 is therefore also patentable over Shamlou, Muhammad, and Jackson, either alone or in combination with one another.

f. Shamlou, Muhammad, and Jackson in view of Chen

Claims 25 and 26 have been rejected under 35 USC 103(a) as being unpatentable over Shamlou, Muhammad, Jackson, and Chen, U.S. Patent Publication No. 2004/0047327 (hereinafter "Chen"). Applicant respectfully requests reconsideration of this rejection for at least the following reasons.

The Examiner cites Chen as allegedly teaching the claimed power sensing circuit and the power level feedback signal. However, even if it is assumed that Chen teaches these features, Chen fails to teach or suggest the features lacking from Shamlou, Muhammad, and Jackson, specifically “a demodulator responsive to the digitally modulated RF signal and configured to generate a low bit weight digital signal by demodulating the digitally modulated RF signal,” as presently recited in independent claim 23. Therefore, Shamlou, Muhammad, Jackson, and Chen either alone or in combination with one another, fail to teach or suggest the features as presently recited in independent claim 23. Accordingly, Applicant respectfully submits that dependent claims 25 and 26 are also patentable over Shamlou, Muhammad, Jackson, and Chen.

g. *Shamlou, Muhammad, and Hansen in view of Jackson*

Claims 28 and 29 have been rejected under 35 USC 103(a) as being unpatentable over Shamlou, Muhammad, Hansen, and Jackson. Applicant respectfully requests reconsideration of this rejection for at least the following reasons.

The Examiner cites Jackson as allegedly teaching a decimating low pass filter. However, even if it is assumed that Jackson teaches these features, Jackson fails to teach or suggest the features lacking from Shamlou, Muhammad, and Hansen, namely a “transmitter ... comprising...a data encoder...encodes said series of low bit weight words...wherein the desired RF signal containing the encoded low bit weight words is transmitted to the receiver via a wireless channel” and “a receiver in communication with said transmitter via at least one wireless channel and receiving said desired RF signal, said receiver including a demodulator ... to generate a low bit weight digital signal by demodulating said RF signal,” as presently recited in independent claim 27. Therefore, Shamlou, Muhammad, Hansen, and Jackson either alone or in combination with one another, fail to teach or suggest the features as presently recited in independent claim 27. Accordingly, Applicant respectfully submits that dependent claims 28 and 29 are patentable over Shamlou, Muhammad, Hansen, and Jackson.

h. Shamlou, Muhammad, and Hansen in view of Chen

Claims 30 and 31 have been rejected under 35 USC 103(a) as being unpatentable over Shamlou, Muhammad, Hansen, and Chen. Applicant respectfully requests reconsideration of this rejection for at least the following reasons.

The Examiner cites Chen as allegedly teaching the power sensing circuit and the power level feedback signal. However, even if it is assumed that Chen teaches these features, Chen fails to teach or suggest the features lacking from Shamlou, Muhammad, and Hansen, namely, a “transmitter … comprising…a data encoder…encodes said series of low bit weight words…wherein the desired RF signal containing the encoded low bit weight words is transmitted to the receiver via a wireless channel” and “a receiver in communication with said transmitter via at least one wireless channel and receiving said desired RF signal, said receiver including a demodulator … to generate a low bit weight digital signal by demodulating said RF signal,” as presently recited in independent claim 27. Therefore, Shamlou, Muhammad, Hansen, and Chen either alone or in combination with one another, fail to teach or suggest the features as presently recited in independent claim 27. Accordingly, Applicant respectfully submits that dependent claims 30 and 31 are patentable over Shamlou, Muhammad, Hansen, and Chen.

6. New Claims

Claims 34-36 have been newly added. New claim 34 recites features, which as pointed out above, are not taught in the prior art of record, for example, “a sampling circuit for over-sampling the analog electric signal and producing a sequence of low bit weight words as a digital representation of the analog electric signal, said low bit weight words having between one and four bits per word; and a transmission circuit processing the sequence of low bit weight words to prepare the sequence of low bit weight words for transmission to a receiver via a wireless channel using an RF carrier and transmitting said RF carrier containing the processed sequence of low bit weight words to the receiver over the wireless channel.” New dependent claim 35 further defines features recited in independent claim 34.

New claim 36 also recites features, which as pointed out above, are not taught in the prior art of record, for example, “a reception circuit receiving an RF signal from a

transmitter over a wireless channel and processing the RF signal to extract a sequence of low bit weight words, said sequence of low bit weight words having a predetermined sampling rate; and a decimating lowpass filter associated with the delta sigma modulator of the transmitter, said decimating lowpass filter decimating the sequence of low-bit weight words provided by the reception circuit to decrease the predetermined sampling rate.”

Applicant respectfully submits that support for newly added claims 34-36 can be found in FIGS. 3 and 6 of Applicant’s specification and corresponding portions of the detailed description. Accordingly, it is respectfully submitted that new claims 34-36 do not present new matter, and are allowable over the prior art of record, and allowance of these claims is earnestly solicited.

**7. Conclusion**

It is respectfully submitted that a full and complete response has been made to the outstanding Office Action and, as such, there being no other objections or rejections, this application is in condition for allowance, and a notice to this effect is earnestly solicited.

If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided below.

It is believed that a \$1620 fee (\$1050 for a three-month extension of time and \$570 for additional claims) has been incurred by this Amendment. If any further fees are required in connection with the filing of this amendment, please charge the same to our Deposit Account debit Account 50-0548.

Respectfully submitted,



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